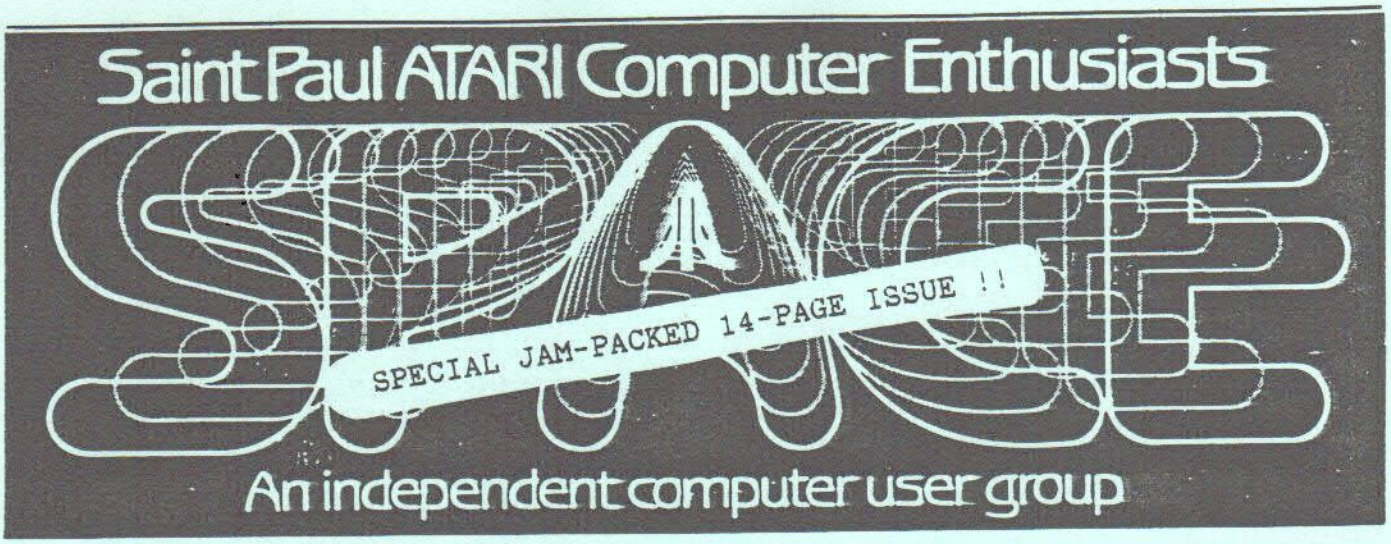

JANUARY, 1986

This month's meeting: FRIDAY, JANUARY 10
At the Falcon Heights Community center

Next month: FRIDAY, FEBRUARY 14

Bruce Haug...President 774-6226
Jim Schulz...Vice-Pres 537-5442
Frank Haug...Disk Lib. 774-6226
Bob Rhode....Editor 222-3593
Bob Siede....Treasurer 489-3982
Bob Floyd....Secretary 487-2627
Jim Siede....Paper/Educational Librarian 489-3982
SPACE/TAIG Bulletin Board...473-2897

In this issue:

5 Hardware Modifications
from MACC and SLCC
Underlining with ATARIWRITER and the 1027 printer
Lesson 07 of Chris Crawford's assembly language course
Plus all the usual columns

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BYTES FROM THE PRES.

Well, has my phone started to ring! I have had calls from the Twin City area, Ohio, and Brainerd. I am glad to help out, even if you are a member - stop and say hi at the meeting - over the phone, even if I don't always get the right name with the right face.

Now one of the problems: I have reprinted in the newletter articles from the SLCC Journal (San Leandro, CA) and the Manitoba Atari Computer Club (Winnipeg, Manitoba). But I can not find a copy of the 48K or 64K memory upgrade for the Atari 400 - one of our members wants it and I would like one for our files. If you have one, please call me at 774-6226, and I can make sure we get 2 copies to the meeting Jan 10th.

I have not found a meeting place for a 520 ST group. Would everyone interested please sign up at the meeting. Then we will know how large of a room to arrange for. Any questions, call me - meeting nites become too short to talk with each of you. Also, if I don't write it down I may forget it. Bring your questions in written form and I will try to get you the answer as soon as I can.

BRUCE HAUG, PRES.

December Meeting Minutes
by Bob Floyd

The last SPACE meeting was held Friday, December 13 with Bruce Haug, the new president, presiding. There were 76 people (10 new) in attendance.

Ray Douglas, from the Computer Broadcasting Company (CBC), was the featured guest. Ray's show, Computerline Radio Show, is on WWTC-AM 1280 radio every Sunday from 10:00 - 11:00 am. The show features ATARI computers on the first Sunday of each month (let's call in and support our computer on 371-2608). Ray had a demo of the "shuttle communicator" which is used to decode (like a modem) computer programs or information broadcast over the radio and stored on a tape recorder. The shuttle communicator is not yet available for Atari computers. CBC also operates a BBS on 729-0408 - password is: CBC?

Jim Schulz, the new vice president, reported on ST news. Jim said that the ROM's & 20 meg hard disks are due in January, Star Raiders & Missile Command due perhaps even sooner and that VIP Professional and Degas are here now.

Jim also reported the rumors of a 3.5" disk drive for the XE and that the XEM chip may be released. Phyllis and Gordy, from Wizard's Work, reported that the Learning Phone (Plato cartridge) and the ATARI 300 baud modems would be in stock soon.

Note: I can verify that the modems are in. -ed.

* Frank Haug, disk librarian, demo'd a utility for "Microillustrator" pictures from the disk of the month.
* Bob Siede, the new treasurer, reported a balance of $1049.
* Joe Danko reported that the BBS is having trouble with "BBS Construction Set" and that it is currently unuseable.
* A SPACE ST minigroup is being formed - all that is needed is a meeting place.
* The ribbon re-inker was ordered, but has not yet arrived.
* A motion was made and passed to make the BBS sysop a club officer with free membership priviledges.

In demos, Gordy from Wizard's Work, reported on the new release of Atariwriter Plus. It has many new features, is disk based and retails for $49.95. Bob Floyd demo'd Graphics Shop, a Print Shop utility to convert "Microillustrator" or "Paint" screens to Print Shop pictures. It was not anything too great, but still useful. Todd Burkey, of Mindtools, demo'd Silent Service, a submarine game.

D.O.M. News
By:Frank Haug

Happy New Year!! Well, this month's disk is a little skimpy, I must admit. This month I was once again UNDERwhelmed by the donations. Come on, people! You must have SOME programs you COULD donate. Nuff said.

I'd like to use this space to explain how to order past disks. If I don't have the disk you're looking for at the meeting, you should PRINT your name, the disks you want, and (optional) your phone #. Ocasionally I run into problems with the orders (For example, poor handwriting or an order for a non-existing disk.). In such instances I would call you to clarify it.

This month we will be selling a double-sided picture disk for $6. Simply boot the front side w/ BASIC in order to view the pictures. To View the flip side, hit BREAK when a picture is being displayed, flip the disk and type RUN.

Now on with the programs on this month's disk.

1.DIAMOND - A clone of the arcade game 'The Pit'. Your ship is low on fuel. Gather the diamonds before it blows up.

2.PHARTOMB.BAS -You must get the keys to escape the tomb. To see further instructions run prog.#3

3.TOMBINST.BAS - Instructions for #2.

4.PEEKASSN.BAS -This program will put the values of user defined memory locations into a disk string & disk file.

Hopefully, I will have added more programs before the meeting.

This meeting I will (I hope) have at least two copies of each DOM we sell.

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*** CHRIS CRAWFORD ***
ASSEMBLY LANGUAGE COURSE
EXCLUSIVELY FOR USE OF WORLDWIDE USERS NETWORK
LESSON SEVEN: INTERRUPTS

We now approach one of the most difficult topics in the world of assembly: interrupts. This is such a messy topic that very few high-level languages make any provision for interrupts. Moreover, interrupts are one of the best ways around crash your program hard. Programmers using interrupts must be very careful.

The standard way to handle this problem is with a technique called polling. Your program runs out every now and then to check whether the high-priority situation has arisen. If it has, then the program responds to it. If not, it returns to its original work.

The problem with polling arises from the choice of polling interval. If you choose a long (infrequent) polling interval, then you may not respond to a demand quickly enough. If you choose a short (frequent) polling interval, then you will respond quickly to the demand, but you will never have any time for your regular computations.

You may think this type of situation is infrequent, but I can list quite a few situations where this is fairly common. Most I/O operations involve short bursts of computation at infrequent intervals, but they must be attended to on a tight schedule. For example, talking to a cassette deck involves very little real work from the CPU, but it must be done according to a precise schedule.

Even a disk drive is very slow by the standards of a 6502. Or how about keyboard response? When the human operator presses a button, he wants to see response NOW, not two or three seconds from now. Yet he could press that button at any time. So should your program sit on its hands waiting for a keypress, or should it ignore the human operator?

The solution to all of these problems is the interrupt. An interrupt is rather like a subroutine that can be called by a hardware action. There's a wire going into the 6502 called IRQ (Interrupt Request). That wire is normally quiet. But when something important happens, like a keypress, the computer's hardware puts a signal on that wire to interrupt the 6502. Here's what happens next:

The 6502 is busy running a program, but when it gets the interrupt signal it first checks the I-bit (Interrupt) in the processor status register. If the I-bit is set, it decides to ignore the interrupt. If it is clear, it proceeds to the next step. It saves the processor status register and the current value of the program counter onto the stack.

Then it loads the program counter with the address stored at a special place in ROM -- it's either $FFFC or $FFFE, I can never get it straight. It thus jumps to the address specified in ROM. It expects to find an interrupt service routine there, which presumably will deal with the keypress in the appropriate manner.

This routine will probably start by pushing A, X, and Y into the stack to preserve them. When done, the routine will then pull them off the stack and execute an RTI instruction, which causes the 6502 to pull the processor status register off the stack, and then pull the program counter off and resume operating.

The important thing about this rather complex sequence is that it allows the 6502 to drop whatever it is doing, service the interrupt, and then return to its earlier functioning without skipping a beat. The overriding goal of all this is to be absolutely certain that, when the 6502 reeturns from the interrupt, it returns in EXACTLY the same state that it was in when the interrupt hit. Otherwise, all sorts of horrible, untraceable bugs would result.

Imagine -- you're in the middle of some huge computation when an interrupt strikes. It subtly changes some very tiny parameter, just enough to insure that when the computation resumes, it will be slightly incorrect. When you try to find the bug, you discover that sometimes the code works perfectly and sometimes it fouls up, and you can't figure out why it should do that. Very bad business!

Moral: interrupts must follow a very tight discipline if they are to be of any utility.

Now let's get into some of the technical gore involving interrupts. First, there are two interrupts on the 6502. They are called IRQ (Interrupt Request) and NMI (Non-Maskable Interrupt). The idea is that the IRQ can be masked out by setting the I-bit with the SEI instruction. Then you use the CLI instruction to clear the I-bit. Thus, IRQ is used for interrupts that have second priority.

NMI is reserved for first-priority interrupts. It is not maskable. However, the designers of the Atari computers routed IRQ and NMI through the POKEY and ANTIC chips respectively. And they put mask registers into these chips. Thus, the NMI can be masked out after all -- but only on Atari computers. Other 6502-based computers don't allow that.

The NMI and IRQ interrupts have separate interrupt vectors in ROM, so they can be treated differently. These vectors route the interrupts to the OS, but the OS is smart enough to route interrupt flow thorugh some RAM locations. This means that you can intercept these two interrupts by altering the contents of the RAM-vectors. (I won't list them here, there are a number of them for different situations.)

You must be careful, though, when altering such a RAM vector. What happens if an interrupt strikes after you have changed one byte of the address and before you have changed the other byte? The 6502 will fly off into never-never land and you have crashed. Sure, it's unlikely, but good programmers don't count on luck to make their programs work. You have to guarantee that the interrupt won't occur before you mess with the vector. Use SETVBV from the OS.

The two primary applications of interrupts with the Atari computers are for VBIs (Vertical Blank Interrupts) and DLIs (Display List Interupts). These are very involved topics covered quite thoroughly in the book De Re Atari. VBIs are most often used for animation control, input handling, and other time-critical operations. For example, the entire player I/O of my game Eastern Front (1941) is handled by VBIs. The scrolling, giving of orders, identifying units, and so forth is all done by VBIs. The mainline routine meanwhile figures the artificial intelligence.

DLIs are used to enhance the graphics on the screen. You can get more colors, more use out of players, more scrolling, and more character sets with proper use of DLIs. Again, consult De Re Atari for a full treatment of this complex subject.

Interrupts are extremely difficult to debug because they tend to crash the system when they fail. You must exercise the strictest discipline in writing interrupt code. Timing problems, seldom of concern in mainline programming, can become critical with interrupts.

What happens, for example, if your interrupt service routine takes so much execution time that more interrupts arrive than you can service? Bad things, I assure you. You must always ask yourself, what happens if an interrupt strikes here? Or there? You must assume that an interrupt will strike at the worst possible time, and write your code to deal with that possibility.

The most important discipline to follow in writing interrupt service routines is this: keep your interrupt database separate from your mainline database. If the ISR can freely write to variables used by the mainline, you will certainly have problems when the mainline attempts to work with variables whose values change in unpredictable ways. You must set up ironclad rules about when the ISR can mess with variables used by the mainline, what it can do to them, and how it notifies the mainline routines that it has indeed altered them.

Approach interrupts with extreme caution. They are very powerful, but every programmer can tell you horror stories about debugging interrupt routines.

Atari 1027 Printer, AtariWriter and underlining

InfoWorld says the Atari 1027 letter Quality printer "does have one of the finest underlines we have ever seen on a home-computer printer."

Unfortunately the combination of AtariWriter and the 1027 is neither covered in the AtariWriter manual nor in the printer book. And $20 for a printer driver seemed high for the underlining capability. This article will tell you how at the cost of a few moments of your time.

If you have the 1982 version of AtariWriter, read on. If you have the 1984 version, the 1027 is one of the printer options and you shouldn't need this article.

To begin underlining, put the cursor under the first character you wish to underline. Then hold the control key down while taping the key for the letter "o" once. (Note: This is the lower case "o" and not the capital "O" as mentioned in the ANTIC article below.) This should put an inverse "O" on the screen (a dark letter "O" inside a bright rectangle). Follow the inverse "O" with the number "15." The characters you wish underlined should follow immediately without and spaces.

Immediately after the last character you want underlined, hold the control key down and type another inverse "O." Then without a space type the number "14."

More information on AtariWriter and printers may be found in the March 1985 ANTIC, pages 34-36.

By the way, a $2 bottle of Stamp Pad Inker fluid from Target can reink the ink roller on the 1027.

The above is a sample of the type and underlining of the 1027

Larry Vanden Plas

ANALOG D.O.M.
Bob Floyd

I will have the December, 1985 (#37) and January, 1986 (#38) Analog Computing disks for sale at the meeting. Price is $4.00 each for registered Analog subscribers only. I will be enforcing this rule now with no exceptions. Here is a list of persons who need to (re-)register their subscriptions with me. You must bring a current issue showing your name on the mailing label:

Bob Arko	Jesse Fleury
Palmer Iverson	Robert Pechman
Kris Kruger	Donald Overland
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810 Write Protection by Choice
Circuit By Andrew Sametz
Article By David Reid
(See Figure 4 on different page)

Notching disks can be pretty painful. Not only does it void your warranty on the disk, but you could destroy the disk by doing it. This little wiring trick to your 810 drive will allow you to write on a disk, ignoring a write protect tab or a non-existent notch. It will also allow you to not write on a disk at all. Of course you can let the drive operate normally.

810 WRITE PROTECTION BY CHOICE

Parts List
DPDT center off toggle switch
Red Led
Wire

The circuit is easy to build, and can be made within an hour. The toggle switch and Led can be mounted where ever you want. If you don't want to drill a hole in your drive case, you can tape or glue the switch to the bottom of the drive (inside). To move the switch, open the drive door, and reach in and move it.

This is a good circuit to build and it's not very hard. Happy Disk Writing.

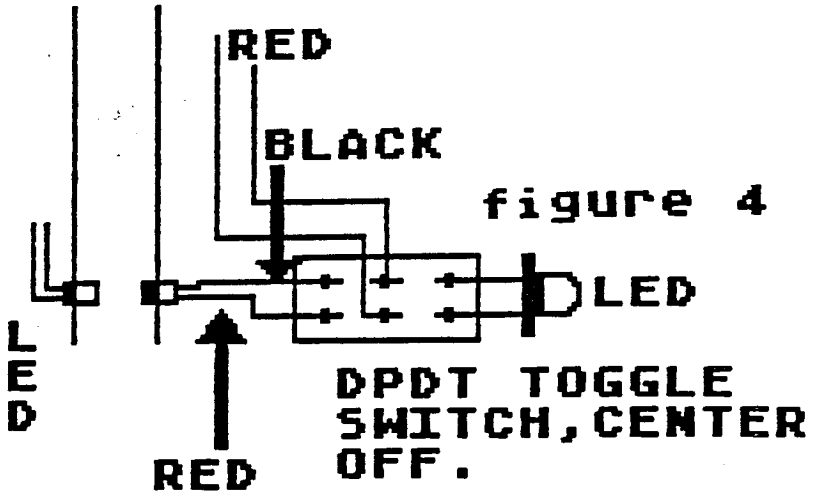


figure 4

Hardware Reset Switch
By David Reid
(See Figure 5 on different page)

Did you now that you can damage your computer by turning it on and off? Well this applies only for the 800/400 computers. The reason is simple. Every time you turn your computer on, the power from the power supply hits the regulators and sends a surge of power through your computer. This will slowly damage your computer, and eventually could kill it. The new computers correct this problem by having the regulators in the power supply. That way, every time you turn on your computer, there won't be a power surge.

So how can you prevent this? The easy way is to use system reset. But sometimes your computer hangs, or a program will not reboot when you hit system reset. The other way is to use a hardware reset. The 6502 CPU will reset it self if told to. By grounding pin 40, it will be told this. When you press the switch the CPU will reset, and simulates turning the power off and on.

I have modified my Atari 800 with the switch. Hopefully it will last a few years longer.

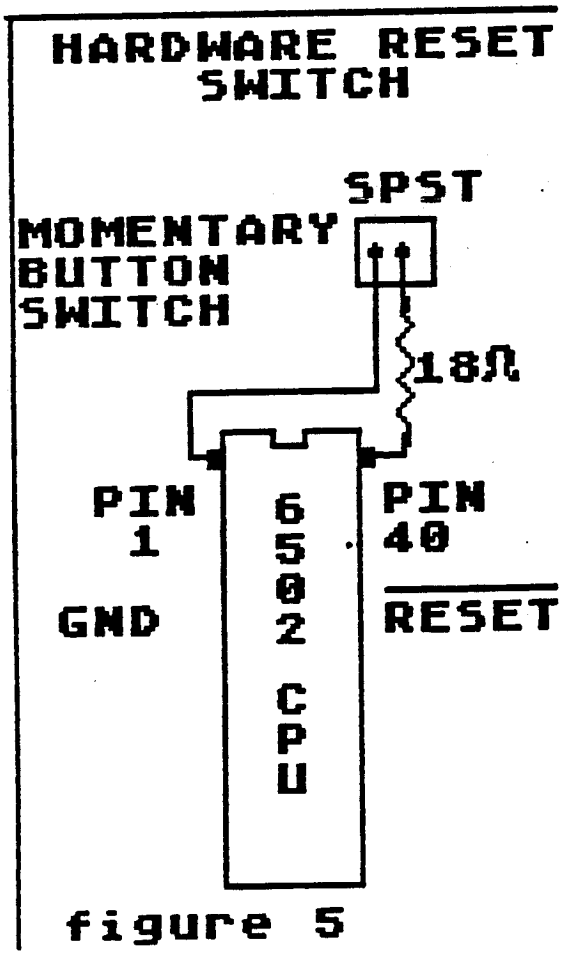


figure 5

Hardware Enhancements
By Jay Torres
(Reprinted from Windhover Project)
Corrections and article modifications
By David Reid and Andrew Sametz

In this article I propose to show you how to modify an Atari 800 to provide 96K of usable RAM. I will also show how to boost memory higher to include a 160K and 288K version allowing full Ram Disk Capabilities.

16K Memory Board Modifications

Remove the center 16K memory board (or use a spare) and install the 64K modification. Look at the RAM board. The eight chips along the top are the RAM chips.The other four are addressing chips.

You shall need to remove the 12V and -5V sources on the board and move the 5V source to where the 12V used to be. As shown in Figure 1A, cut the trace from pin X of the boards's edge connector to C521. Also cut the trace going from edge pin Y to C523. Make the cuts cleanly and be careful not to damage adjacent traces.

Remove C521 and C523. The trace coming from pin W carries 5V. Using a short piece of wire make a solder bridge between this trace and the old 12V trace at the point where C523 used to be. Next, remove C503, C505, C507, C509, C511, C513, C515, and C517.

Remove the eight 16K RAM chips and insert the 64K RAMS in their place. using an ohmmeter insure that there is no connection between edge pin Y and pin 8 of the RAMS. There should also be no connection between any two of the edge pins W, X, and Y.

Assuming all has gone well the board should function exactly like a 16K board since we have not changed the addressing circuitry. Now is a good time to check the board. Put the modified board in the center memory slot of the 800 and check to see that it functions normally as a 16K board. If not, then recheck all of your work...

Now remove the 5V supply from pin 9 of the RAMS. To do this, cut the wide trace on the chip side of the board as shown in Figure 2A.

Get a 74LS158 chip and use a pair of needle nose pliers, carefully bend up all of the pins except pins 1, 8, 15, and 16. Remove the chip at Z503 from it's socket and place the 74LS158 on the top so that the four pins not bent touch the same four pins on the lower chip. Carefully solder the four pairs together.

Next, solder a four inch piece of wire to each of the pins 2, 3, and 4 of the top chip. Set the chip pair aside

at this point.

Next, we will prepare the three additional ICs for mounting. These will be mounted in the "dead bug" style, so it may be a good idea to put a stick-on label on the underside of each IC to indicate its type and the location of pin 1.

Install the new ICs in the vacant space below the RAMS. I used small pieces of double sided tape in case I would need to remove them. A drop of super glue will work but be sure to do it right the first time.

Now wire the chips according to figure 1. Next, install the chip pair set aside previously into Z503 and complete it's connections.

At this point connect a temporary jumper between pins V and W.

Replace the memory board in the center memory slot for testing as a 16K board. If the blue screen does not come up quickly, turn the computer off IMMEDIATELY and recheck your work.

If the board checks out all right, remove the board from the computer and remove the jumper between V and W. Now cut the circuit traces connecting pins M to N, P to R, and S to T.

The 64K board is complete. Put it aside for now.

Remove the two remaining 16K boards from the computer. On the reverse side of each board find the traces connecting pins M to N, P to R, and S to T. Cut these traces on each board. Reinstall them in the computer's first and third slots.

Personality Board Modification

Remove the ROM board and take it out of it's case. Connect a jumper between Z401 pin 7 to edge card pin 20. Do not allow solder to run down the card edge pin. Reinstall the ROM board in the computer.

Motherboard Jumper Installation

It is now necessary to modify the 800 motherboard. Disassemble the 800 and place the motherboard upside down with the joystick ports facing away from you. Using figure 5 as a guide, install seven jumpers using a fine solid conductor, insulated wire.

Carefully check your work, paying particular attention to correct pins, solder bridges and shorts.

Reassemble the 800. The modification is complete.

Final Testing

After assembling the computer reinstall all of the cards with the 64K board in the center memory slot. Power up the computer and wait for the blue screen to appear. As before, if it does not come up at once turn off the computer and recheck your work.

If all is normal then congratulations! You now have an Atari 800 with 48K of normal memory and 48K of extended memory. When used with Windhover DOS 96 this provides a 360 sector, single density, virtual disk.

128K Ram Board Option

The 64K modification may be extended to 128K by the addition of more decoding chips and 8 additional 4164 RAM chips.

The second set of 64K chips are placed piggy-back on the first set with only pins 15 (CAS2) elevated and bussed together. Cut the CAS trace near Z502 as shown in figure 2. Mount the 74LS157 piggy-back on Z504 with all pins elevated except pins 8, 15, and 16. Wire the elevated pins as shown in figure 3.

When used with the Windhover DOS 160 this option provides a 720 sector, single density virtual disk.

256K Ram Board Modification

The 256K x 1 RAM IC (41256) is now available. When the price is right, you can use them by simply installing five additional connections to the 64K enhancements. Make the substitutions as shown in Figure 4 and substitute the 256K chips.

This option provides a full 720 sectors of single or double density virtual disk with RAM left over to use as scratch pad, multiple display lists, etc. The possibilities for the use of this extra memory are almost endless. Use of the RamDisk when running AMODEM will significantly reduce both upload and download time along with your phone bill. Disk duping becomes extremely easy when you use COPY *.* to copy to and from the virtual disk. Programs which leave your drive spinning for extended periods of time can often be modified to perform faster with no wear on the drive.

The Windhover Project has developed a DOS which will access the extra memory and make it work as a virtual disk. It is 100% compatible with Atari DOS 2.0. It allows rebooting from RamDisk following system reset, allows an instantaneous call to the DUP.SYS, generates a MEM.SAV file to save data you were working on in memory and is available from me in versions for use with the Atari 400 with the 64K RAM modification as well as the Atari 800 with 96K, 160K, and 288K RAM modifications.

Price on the Windhover DOS is $20 including the disk and documentation plus $1.50 postage and handling. ($15 if you send a disk to me.) If you opt

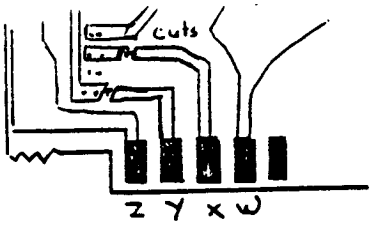


Figure 1A

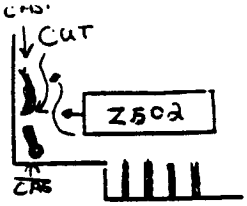


Figure 2

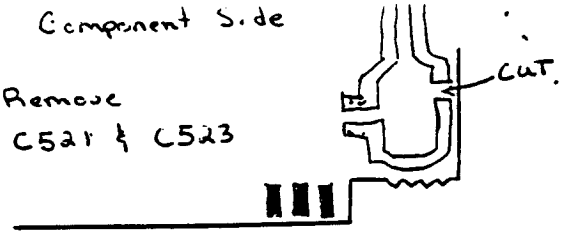


Figure 2A

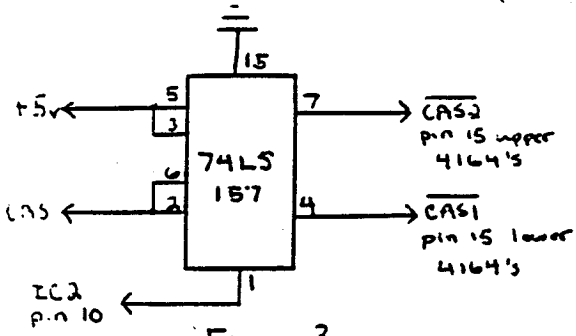


Figure 3

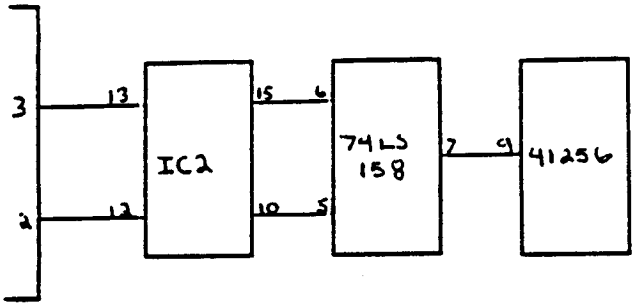


Figure 4

IC1 : 74LS02
IC2 : 74LS175
IC3 : 74LS86
IC4 : 74LS158

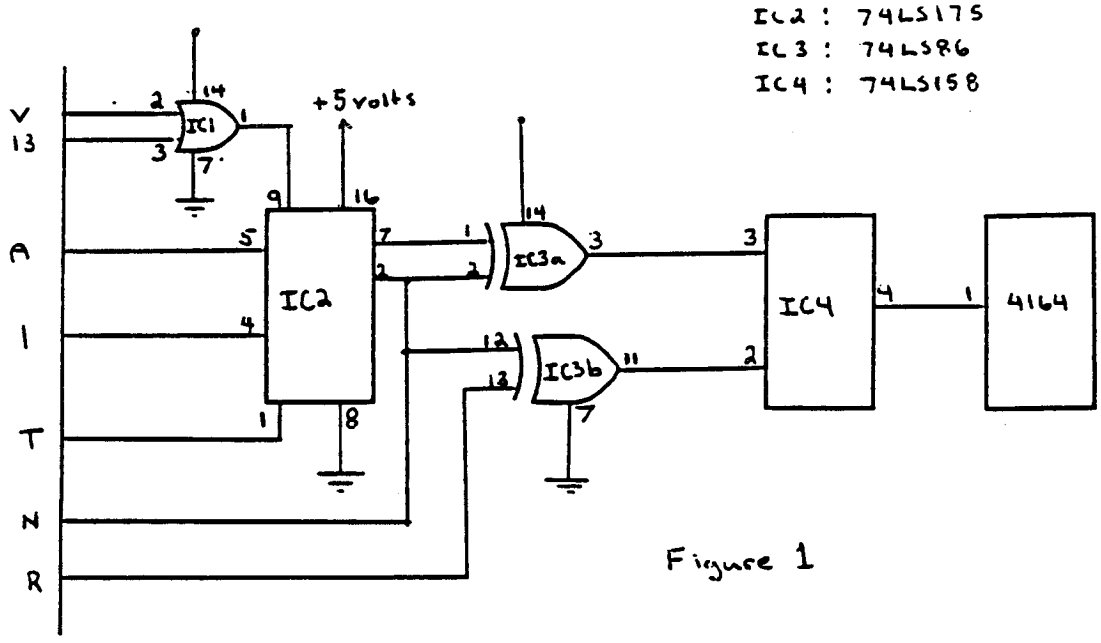


Figure 1

DIAGRAMS FOR MEMORY EXPANSION ON OTHER SIDE OF PAGE

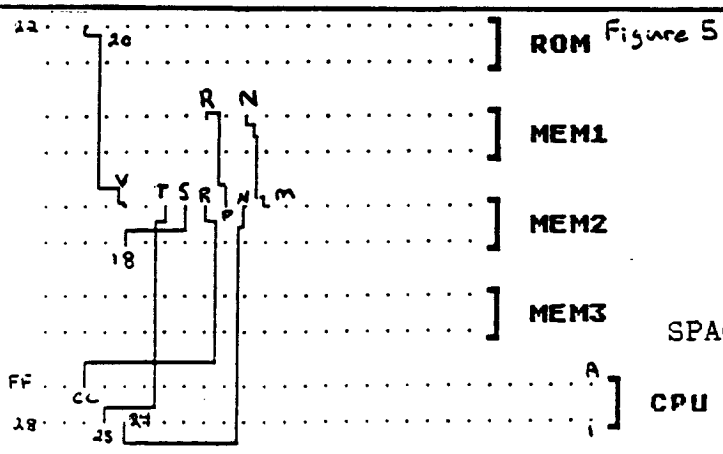


Figure 5

to send a disk, be sure to include a mailer so that i can send it back to you.

If you want a copy of Windhover DOS send a money order for the correct amount to: Jay Torres, 723 Arbor Street, Vandenberg AFB, CA, USA. Be sure to indicate which version you want and if the virtual disk should be designated disk drive number 2, 3, or 4.

SLCC

Hardware Mod

CLAUS BUCHHOLZ

A 130XE-COMPATIBLE 256K UPGRADE
FOR THE ATARI 800XL

I designed the 256K upgrade described in my article, "The Quarter-Meg Atari" (BYTE, September, 1985), in December, 1984. Since this predated the 130XE, there was no precedent for extended memory on the XL's. I felt free to implement a system of eight 32K banks. The major reason was to keep the add-on circuit as simple as possible.

The 130XE, introduced in early 1985, set a different standard for bank-select memory. It uses 16K banks and makes them separately available to both the CPU and the video controller (ANTIC). The XE has 128K total memory. The 64K extended RAM is split into four 16K banks.

A 256K 800XL has 192K extended RAM, which requires 12 16K banks. I have designed a new upgrade for the 800XL that implements such a scheme. Its similarity to the 130XE's scheme allows use of software for the XE on a 256K 800XL.

To select one of four banks, the XE uses two bits, #2 and #3, in the memory control register (port B of the 6520 PIA, addressed at $D301 or 54017 decimal). Zeroing bit #4 makes the selected bank appear at addresses $4000-$7FFF (16384 to 32767 decimal), as seen by the CPU. Zeroing bit #5 makes it appear there as seen by ANTIC.

In my upgrade, bits #2, #3, #5 and #6 select one of the twelve banks. Zeroing bit #4 makes the selected bank appear at $4000-$7FFF to both the CPU and ANTIC. So, any program for the XE that uses the extended RAM for CPU storage will work on an 800XL with this mod. Those programs won't use the additional 128K, though. Programs that use the video banking feature of the XE might run on the modified XL, but the screen display will be wrong.

The procedure for this upgrade is basically the same as in the article, except for the following points. If your ANTIC (U7) part number is C021697, use the circuit of the figure, excluding the area inside the dotted lines. If it is the C012296, include the circuit inside the dotted lines. The circuit requires five connections to the PIA (U23). So pins 12 through 16 must be bent up and connected to the circuit. The rest of the procedure is the same. Notice that this circuit has one more chip than the article's circuit. This is the price of compatibility.

With the 256K dynamic RAMs in your XL, be sure to wait at least ten seconds after turning the computer off before you turn it back on. Otherwise it may not coldstart properly.

My original RAMdisk software doesn't work with this new mod. Enclosed is a listing of the new version. It is used in the same way, except that it offers a choice of either two single-density RAM disks or one double-density. If you wish a disk copy of the source and object code, send me a blank disk and return mailer with full postage, and I will promptly send it back with the software (Claus Buchholz, 201C East Edgewood, Lansing, MI 48910). Alternately, you may download the software from the Capitol Hill Atari Owners' Society BBS at 517-371-1106 or from the Castle Communications board at 517-371-4234. The source file is called QMEGXLD.SRC for Quarter-MEG XL Double.

Also available is a RAMdisk program that sets up one single-density RAMdisk and leaves the XE-equivalent banks free for XE software. This is quite useful with BASIC XE, DOS 2.5, or the new Synapse software. Its name is QMEGXLS.SRC.

I ask one thing in return for this information: please pass it around to all your interested friends. Put it in your club's library or on your favorite BBS. Encouraging software support of 256K will result in many interesting uses for it. Thank you and enjoy!

P.S. In response to an often asked question, I state that I have no documentation for my 192K upgrade for the 800. It involves modifying an Axlon 32K board to imitate a 128K Axlon RAMDISK and upgrading an Atari 16K board to 64K. It is a difficult mod, and I recommend the XL mod instead.

(SLCC JOURNAL EDITOR'S NOTES: We recommend reading the BYTE article mentioned above for a better description of the basic modification, then apply this article's information to your mod.)

PARTS LIST

8 41256 256K-bit dynamic RAM (200ns or less)
1 74LS153 Dual 4-to-1 multiplexer
1 74LS139 Dual 2-to-1 decoder
1 33 ohm, 1/4 watt resistor
1 Radio Shack # 276-150 circuit board
1 16-pin DIP header and short ribbon cable
3 16-pin low profile sockets

ADDITIONAL PARTS FOR ANTIC #C012296

1 74LS158 Quad inverting 2-to-1 multiplexer
1 74LS393 Dual 4-bit counter
1 16-pin low profile socket
1 14-pin low profile socket

DEFINITION OF MEMORY CONTROL REGISTER AT $D301 (54017 decimal)

XL MOD

bit: 7 6 5 4 3 2 1 0
D a b E c d B R

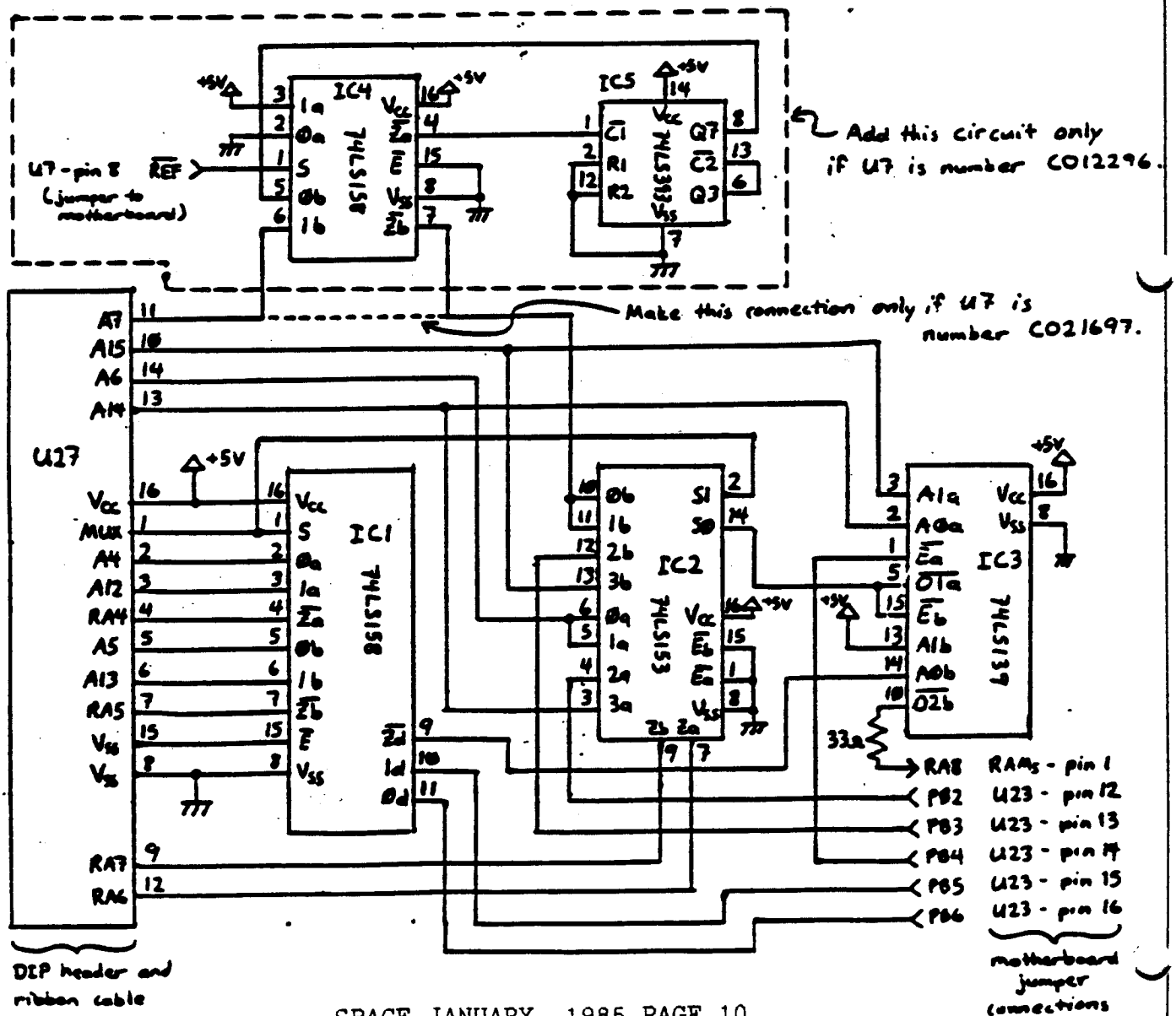
D=0 enables diagnostic ROM
B=0 enables BASIC ROM
R=1 enables OS ROM
E=0 enables extended RAM
abcd is 4-bit extended RAM bank #
- ranges from 4 to 15
- banks 12 to15 are equivalent to XE's banks 0 to 3

130XE

bit: 7 6 5 4 3 2 1 0
D V C x y B R

D=0 enables diagnostic ROM
B=0 enables BASIC ROM
R=1 enables OS ROM
V=0 enables extended RAM for video
C=0 enables extended RAM for CPU
xy is 2-bit extended RAM bank #
- ranges from 0 to 3

256K FOR 800 XL, ATARI 130 XE COMPATIBLE - by Claude Buchholz, SLCC



Low Cost RGB

(Schematic Reprinted from Bay Area Atari User Group, May 1985)
Article modified by MACC
(See diagram on a different page)

This is a useful circuit if you happen to have an RGB monitor and an old Atari 800 computer. Before now, you could never use a RGB monitor with your Atari. This circuit will allow you to do this.

The circuit given is for use with an IBM compatible monitor. I do not know if it will work with any RGB monitor. I will tell you how to modify the circuit so that you can use any other monitor.

Common Procedures

For those with RGB adjustments on their monitor the installation is simple. The soldering of the five wires to the appropriate pins of the A103 chip and the soldering of the five leads to a chassis mounted 5 pin female RCA plug finishes the job (Fig. 1).

For all other owners of just simple RGB video input with no separate RGB controls you just follow the schematic (Fig. 2) and make the same soldering connections as in the first example.

We find it is easier to use a 14 or 16 pin DIP socket to solder all four transisotrs on with the 68 ohm and the 500 ohm (sic) potentiometers. This way you can do a clean installation by drilling three small holes in the side of the chassis for mounting the three potentiometers with a good two part epoxy so you can have easy adjustments of your RGB output with a small screwdriver. Then at the same time you can epoxy the 14 or 16 pin DIP socket to the inside of the 800 cabinet.

Using an IBM Monitor

Parts List

- 3 - 2N2222 transistors
- 1 - 2N2907 transistor
- 4 - 68 ohm resistors
- 3 - 1 K ohm resistors
- 1 - 270 ohm resistor
- 1 - 470 ohm resistor
- 3 - 500 ohm potentiometers
- 1 - 1 K ohm potentiometer
- 1 - 14 or 16 pin DIP socket
- 1 - RCA 5 pin chassis mount female plug
- - Some wire

Using an Other RGB Monitors

Parts List

- 4 - 2N2222 transistors
- 4 - 68 ohm resistors
- 3 - 500 ohm potentiometers
- 1 - 14 or 16 pin DIP socket
- 1 - RCA 5 pin chassis mount female plug
- - Some wire

The changes on the circuit (Figure 2) are minor and should be done before you start making the circuit.

First, eliminate all 1K ohm resistors (Do not connect the 68 ohm resistor to the 500 ohm pot!). Next eliminate the 470 ohm resistor but this time connect the transistor to the other transistors. The 2N2907 transistor should be changed to a 2N2222 (connect the emiter to the 68 ohm resistor). Now remove the 270 ohm resistor and the 1K ohm pot. Do not connect the ends! And finally connect the base of the new transistor to Sync In.

If you have any problems, you can check the newsletters in the newsletter library (HACE June 85, ACE April 85).

Bob's Blurb

A note from the editor

First of all, let me express my appreciation to the members of SPACE, all of whom showed concern for my printer problems. I wish I could have come to the meeting to soak up the sympathy in person!

What happened was this: Mysteriously, overnight, my APE-FACE printer interface died. It had worked prefectly since the day I bought it, and I had been using it the night before. But, wouldn't you know it, on the night I was putting together the final copy of my first newsletter to be printed the next day, it didn't work at all. All of my software said "printer offline" or "device unavailable." Since the printer did it's test pattern okay, that meant that the interface was at fault.

I went in to Wizard Works a couple days later and the lovely lady gave me a replacement. once again, I appreciate your concern.

Next on the agenda, someone left a hat at the last meeting. If anyone is missing a man's hat, the officers think it would be swell if you reclaimed it.

The third thing I have to say is that the articles in this month's newsletter from MACC (Manitoba Atari Computer Club, Ontario) and SLCC (San Leandro Computer Club, San Leandro, CA) involve some pretty sophisticated work inside your computer, and unless you feel quite confident of your soldering skills, you should probably not try these modifications on your own.

RGB output from Atari 800 Computers.

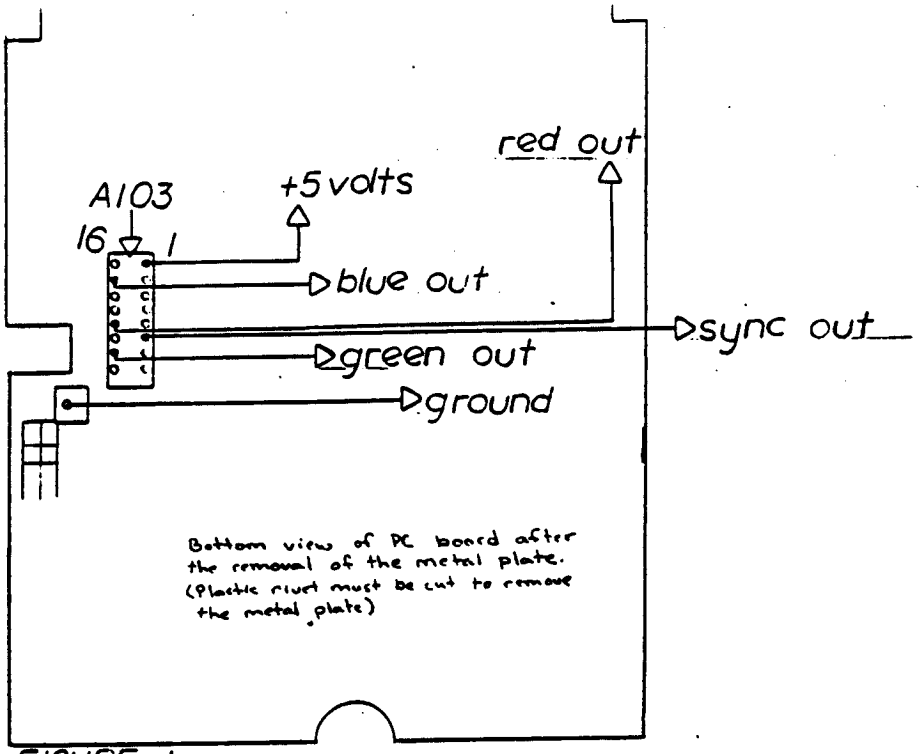


FIGURE 1

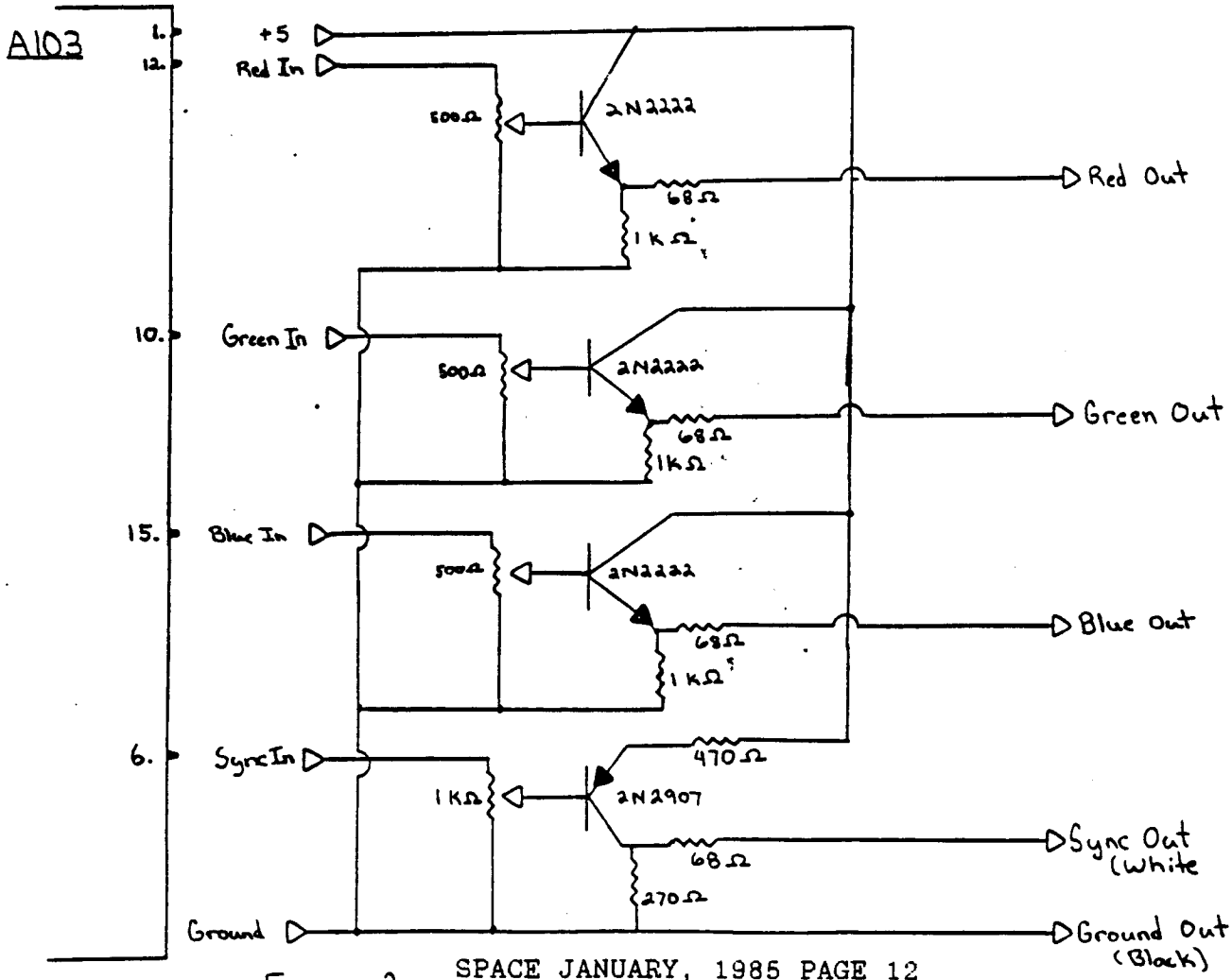


Figure 2

MINDTOOLS INC.

THE MAN/MACHINE INTERFACE SPECIALISTS

542-1027
Evenings and Weekends
Todd Burkey and Steve Pauley

Atari 8 bit

We have tripled our inventory of 8 bit software in the last month. This means more in stock selections than before and still at the best prices in town.

Products for the 8 bit line	Retail Prices	Mindtools Prices
Great American Road Race	24.95	19.95
Hacker	24.95	19.95
Bounty Bob Strikes Back	49.95	34.95
Karateka	29.95	23.95
Print Shop	44.95	32.95
P.S. Graphic Lib.	24.95	19.95
Goonies	29.95	23.95
Zorro	29.95	23.95
Eidolon	39.95	29.95
Koronis Rift	39.95	29.95
Spellbreaker	34.95	26.95
Silent Service	34.95	26.95
Lode Runners Rescue	29.95	23.95

Classic Sale

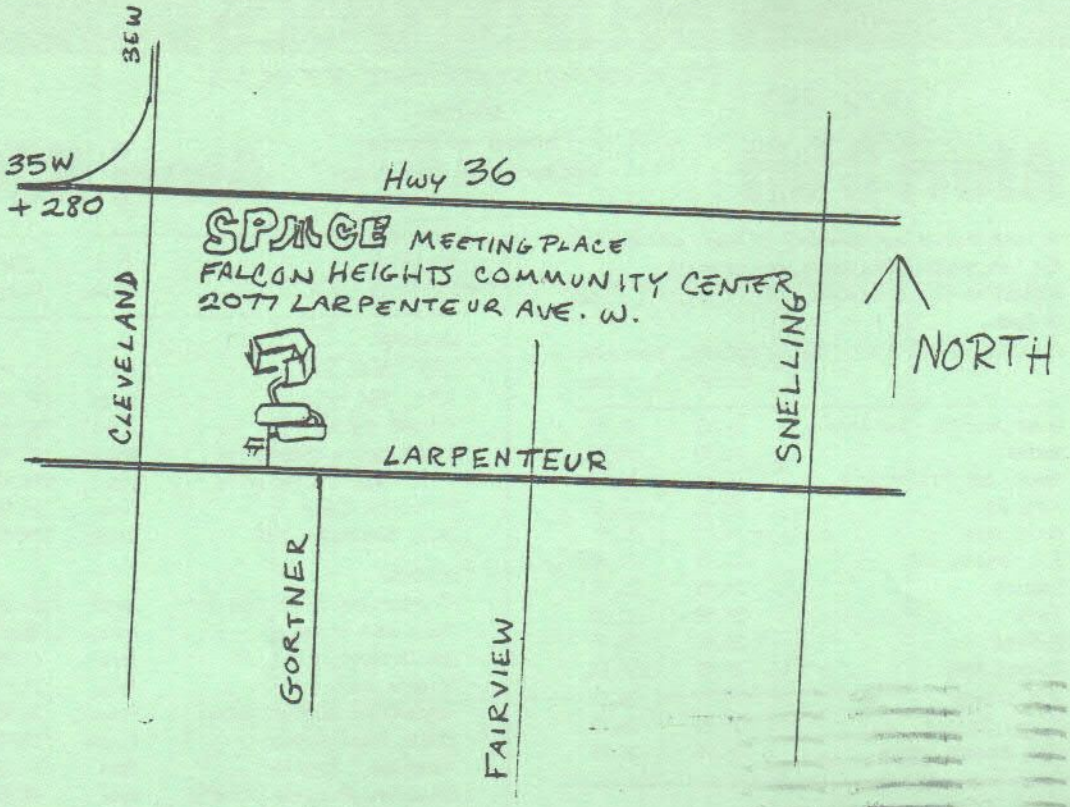
Quantities for items listed as Clearance are all we can get...one of our distributors liquidated all of their inventory, so this may be the last chance we can get any of these again. (these are the good games that were in the inventory. Most of these are cartriges, so they are great for kids.

Clearance for 8 bit line:	QTY	Retail	Clearance
Miner 2049er	(4)	$34.95	$10.00
Joust (cart)	(1)	49.95	16.95
Pacman (cart)	(2)	44.95	10.00
Galaxian (cart)	(2)	44.95	9.00
Asteroids (cart)	(2)	34.95	9.00
Centipede (cart)	(2)	44.95	10.00
Jumbo Jet Pilot (cart)	(1)	44.95	10.00
Popeye (cart)	(4)	49.95	9.00
Star Raiders (cart)	(5)	44.95	10.00
Pooyan (disk&cass)	(2)	29.95	9.00
Repton (disk)	(2)	39.95	10.00
Jumpman Junior (cart)	(5)	40.00	10.00
Defender (cart)	(4)	44.95	10.00
Qix (cart)	(2)	44.95	10.00
Missile Command (cart)	(2)	34.95	9.00
Submarine Commander (cart)	(2)	44.95	12.00
16) Bandits (disk)	(2)	34.95	10.00
Deluxe Invaders (cart)	(2)	39.95	9.00
Super Breakout (cart)	(2)	34.95	8.00
Pitstop (cart)	(2)	40.00	9.00
Super Cobra (cart)	(2)	49.95	10.00
Q-Bert (cart)	(2)	49.95	11.00
Spider City	(1)	39.95	8.00

Atari 520ST

Product Name	Mfg. Name	List Price	Mindtools Price
HARDWARE			
520ST (Mono. Ver.)	Atari	$799.95	$719.95
520st (RGB Ver.)	Atari	999.95	899.95
12" RGB Monitor	Atari	399.95	359.95
3 1/2" Single Sided Drive	Atari	199.95	179.95
3 1/2" Double Sided Drive	Atari	299.95	269.95
ST Printer Cable	Accu.	24.95	21.95
Hayes Smartmodem 1200	Hayes	599.95	399.95
SOFTWARE			
PC/InterComm (VT100 Emulator)	MarkU	$124.00	$99.95
Mince Text Editor	MarkU	175.00	139.95
Spellbreaker	Info	44.95	33.95
Infocom Games	Info.	39.95	32.95
Hitchhikers Guide to Galaxy	Info.	39.95	32.95
Exotic Hippo Almanac	Hippo.	34.95	28.95
HabaHippo C Compiler	Haba	74.95	60.95
Solutions (Business Letters)	Haba	49.95	39.95
Haba Writer	Haba	74.95	60.95
VIP Professional	Shanner	179.95	143.95
Mirage Word Proccessor	Express	49.95	39.95
A Mind Forever Voyaging	Infocom	44.95	34.95
Kings Quest II	SierraO	49.95	39.95
Ultima II	SierraO	59.95	47.95
Mud Pies	Mich	29.95	23.95
Hex	MarkU	39.95	31.95
Rythem (spread sheet/calculator)	N/A	49.95	39.95
ST ToolBox Vol. 1	Mirage	39.95	31.95
Degas Graphics Drawing	BatInc	39.95	31.95
4xFORTH	Dragon	99.95	79.95
Easy-Draw	Migraph	149.95	119.95
Flip Side	Mich	34.95	27.95
Atari ST Companion (Book)	Sunshine	19.95	14.95
Pascal, Personal	OSS	89.95	71.95
Bulk 3 1/2" Disks	Fuji	3.95	1.95
Crimson Crown	Pengs	39.95	31.95
Fahrenheit 451	Spinn	49.95	39.95
Final Word	MarkU	145.95	119.95
Backgammon, Hippo	Hippo	39.95	31.95
Jokes & Quotes, Hippo	Hippo	34.95	27.95
Disk Utilities, Hippo	Hippo	49.95	39.95
Ram Disk, Hippo	Hippo	34.95	27.95
HippoSimple	Hippo	49.95	39.95
HippoSpell	Hippo	39.95	31.95
M-Disk	Mich	39.95	31.95
Regent Spell	Regent	49.95	39.95
Regent Word	Regent	49.95	39.95
ST-Talk	QMI	17.95	14.95
Transylvania	Pengs	39.95	31.95
Treasure Island	Spinn	39.95	31.95
Typing Tutor w/Word Invaders	Acads	34.95	27.95

Mindtool's ST Access Group members get an additional 5% off Software



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